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COMMENTARIES ON SPIRANTHES, I

BY

OAKES AMES

I. SPIRANTHES TUBEROSA sensu FERNALD

IN JANUARY 1946[1], Professor M. L. Fernald resurrected from outdated literature the obscure species *Spiranthes tuberosa* Raf. (1833), type specimens of which are not known to exist. In seeking some element in our flora with which this ambiguous Rafinesquian product, interpreted by a twenty-one word description, might be specifically identical, Fernald hit on the "white lipped *S. Beckii* Lindl." (1840), stating that there was certainly no doubt about it. He failed, however, to explain how he discovered that *S. tuberosa* had a white lip. Rafinesque certainly gave no clue, for, in his brief description, he dismissed the lip with just two descriptive terms. He used the words "*cuneato acuto,*" which do not apply to the lip of any known species of Spiranthes in the flora of the United States. Fernald claimed that *S. tuberosa* not only is identical with and antedates *S. Beckii* Lindl., but is also the characteristic species described in 1867 by Asa Gray as *S. simplex* (a homonym of *S. simplex* Grisebach and a synonym of *S. Grayi* Ames).

In August 1946[2], Fernald discussed the identity of *Spiranthes tuberosa* at greater length. He showed that, from the bibliographic evidence, *Spiranthes Beckii* Lindl. ''taxonomically'' was as hopeless a muddle as could be imagined since it was concocted from elements of several different species. He pointed out in detail how Lindley, at a time when nomenclatural procedure was governed by less rigid rules than are now observed, adopted the specific name ''Beckii'' in violation of all obligations to the synonymy cited. Fernald, consequently, quite properly dismissed the name, *S. Beckii*, as being doubly illegitimate. He also recognized two strongly marked geographic variations in *S. tuberosa*, a southern one and a northern one. He assigned the species name to the southern element and reduced *S. Grayi* to varietal status for the northern element.

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[1] Rhodora 48 (1946) 10.

[2] Rhodora 48 (1946) 189.

Actually and taxonomically *Spiranthes Beckii* is the ancient, well-established and well-known *S. gracilis* (Bigel.) Beck, which nomenclaturally antedates *S. tuberosa* by nine years. When John Lindley, in his ''Genera and Species of Orchidaceous Plants'' (1840), described *S. Beckii*, he cited two collections of specimens as being referable to it: one from Massachusetts (without collector), the other from Louisiana (Drummond 332). The type sheet of *S. Beckii* in Lindley's herbarium at Kew contains these two collections, and also a third consisting of two plants from Albany, New York, collected by Beck. As Lindley did not refer directly to these New York plants in his description, it may well be that they were acquired after 1840 and consequently should be excluded from any discussion of the Lindleyan type of *S. Beckii*. (It may be noted, however, that camera-lucida drawings of the lips of the New York plants, made by Victor S. Summerhayes, show that in outline and neuration they exemplify *S. gracilis* (Bigel.) Beck).

The Massachusetts specimen on the type sheet (collector unknown) is accompanied by the following note:

Spiranthes aestivalis var. gracilis Torr. mss.
S. gracilis Beck
Neottia gracilis Bigelow fl. bost. ed. 2.
This hardly differs specifically from S. aestivalis. The common variety not infrequently bears a small ovate radical leaf. Massachusetts.

Mr. Summerhayes has also made for me a camera-lucida drawing of the lip of this Massachusetts plant. There can be no doubt about its being typical *S. gracilis.* Indeed, when Asa Gray described *S. simplex* in 1867, in the fifth edition of "The Manual," he was familiar with Lindley's type of *S. Beckii* and referred the latter species to *S. gracilis,* "at least as to the northern plant." This reference to the northern plant was made because the type sheet of *S. Beckii* also carried the specimens from Louisiana.

In our discussions of the components of Lindley's illegitimate *S. Beckii* we must give close attention to these Louisiana collections made by Drummond in 1832 near New Orleans, especially so since Asa Gray believed Drummond's 332 to represent plants that were different from the northern *S. gracilis.* In the Gray Herbarium there is a duplicate of Drummond's collection annotated by Gray as *S. Beckii.* In 1904, I accepted this Drummond plant as being referable not only to *S. Beckii* Lindl., but as being conspecific with *S. Grayi* Ames (*S. simplex* Gray, not Grisebach). More recent studies have proved that *S. Grayi* is a distinct species. I am indebted to V. S. Summerhayes again for his great kindness in sending me a carefully executed camera-lucida drawing of the lip of Drummond's 332 in the Lindley Herbarium. The Kew plant is identical with the duplicate in the Gray Herbarium and is clearly the same as the rather common southern Spiranthes recently recognized as *S. gracilis* var. *floridana* (Wherry) Correll.

Fernald has annotated the Drummond plants and several other similar southern specimens in the Gray Herbarium, clearly referable to *S. gracilis* var. *floridana,* as typical *S. tuberosa* Raf. and these may be taken to indicate the strongly marked geographic variant to which he referred in "Rhodora"[3]. From a study of these specimens and of Professor Fernald's remarks, it is apparent that he has misidentified some of the southern representatives of *S. gracilis* and has treated them as conspecific with the slender forms of *S. Grayi* which range southward to Georgia, Alabama and Mississippi. Actually *S. gracilis* var. *floridana* is quite distinct from *S. Grayi.* It differs in the relatively narrower blade of the lip which is usually constricted near the apex and is conspicuously 5-nerved on the claw. The lip ranges between 3 mm. and 5 mm. in length. (The lip of the Drummond specimen, for example, is 3.4–4 mm. long.) The lip of *S. Grayi* in relation to its length is broader than the lip of *S. gracilis* var. *floridana.* In outline it is commonly broadly ovate, obtuse or rounded-quadrate, the average length being about 3 mm. The blade of the lip is white and rarely more than 3-nerved beyond the middle. It gives the impression of being 3-nerved on the claw and paucinervate above. The lip of *S. gracilis* var. *floridana* is yellow on the central portion. In the extreme South *S. Grayi* is a very rare species and some of the herbarium records that have been relied upon for reporting Florida stations should be restudied to ascertain whether or not they are actually based on variants of *S. Grayi* or on variants of *S. gracilis* var. *floridana.* Furthermore, the likelihood of hybridity should not be overlooked where *S. Grayi* and *S. gracilis* mingle.

In his reduction of *S. Grayi* to varietal rank, Fernald, as stated above, was influenced by the belief that *S.*

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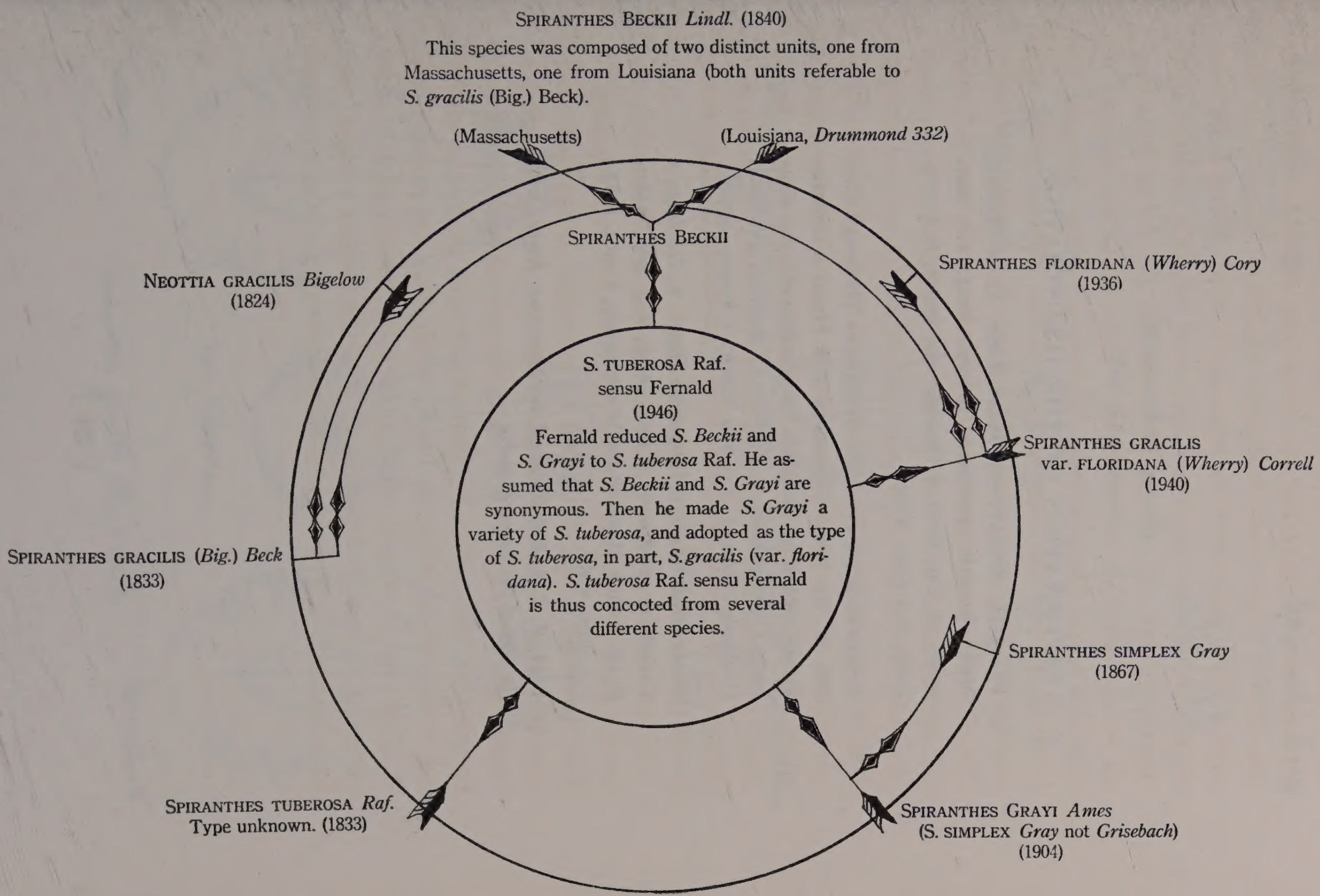
[3] Rhodora 48 (1946) 192.

tuberosa, as he interpreted it, consists of two strongly marked geographic variations. He stated that essentially all the material from New England belonged to one category, readily recognizable by the relatively close spikes of closely spiralling, often crowded flowers, and a thick, usually solitary vertical "tuber." To the other category he assigned all the material in the Gray Herbarium from eastern Texas to Florida and north to South Carolina in which the spikes are strongly secund without or with few spiral twists in the rachis and with the relatively few flowers distant and not overlapping. Fernald stated further: "From North Carolina to New Jersey both variations, with some transitions, occur, the plant often reaching a height of 5.25 dm., while its roots are usually more slender and not infrequently 2 or even 3. This is true *S. tuberosa* Raf. . . ." It is difficult to see why *S. tuberosa,* described by Rafinesque as "rad. tuberosa monorchis" should be applied to the southern variant with not infrequently 2 or even 3 roots, rather than to the northern one with its characteristic thick solitary turbinate root.

In his recent articles on Spiranthes, Professor Fernald has placed stress on the structure or aspect of the spikes and on the presence or absence of foliage at flowering time, seeming to regard vegetative characters as reliable guides to specific differences in the genus. Whether the spikes are congested or slender; whether they are composed of many spirals or of few; whether the flowers are quaquaversal or secund is a manifestation of the nature of seasonal growth. The behavior of the flowers in the spikes in their response to torsion does not give rise to a fixed specific or inherited pattern. As should be expected, rachidial torsion varies in intensity from plant to plant, and in the same species varying degrees of spirality in the arrangement of the flowers may be regarded as the consequence of individual variation or as the effects of climate or environment. Under certain climatic conditions and in response to favorable edaphic influences the flower scape may elongate rapidly. Torsion in the rachis then becomes so regulated that secund flowers with closely imbricating bracts are the rule rather than the exception (cf. Plate III, fig. 3). If floral development is hastened by climatic conditions, the period of anthesis coincides with the maturing of the foliage. In Florida, where the spring approaches with a rush and vegetation becomes suddenly active, *S. gracilis* var. *floridana* has its commonly secund flowers fully open before the leaves have had time to attain maturity. This happens also in the northern area of distribution for the species. It would be a very simple matter to pick out dried specimens of *S. gracilis* from Nova Scotia and dried specimens of var. *floridana* from Florida which would be so alike in floral and vegetative aspects that even expert botanists, without helpful labels to assist them, would be unable to tell these variants apart.

It would seem that in his treatment of *Spiranthes tuberosa* Raf. Professor Fernald has added measurably to the "muddle" he attributed to Lindley, inasmuch as *S. tuberosa* Raf., *sensu* Fernald (like *S. Beckii* Lindl.) is "concocted from elements of several different species." In view of the difficulty experienced in properly applying the name *S. tuberosa* Raf., without a type specimen to guide us, it would seem preferable to abandon it, and to use *S. Grayi* Ames and *S. gracilis* (Bigel.) Beck var. *floridana* (Wherry) Correll for the two elements involved.

PLATE I


SPIRANTHES BECKII *Lindl.* (1840)
This species was composed of two distinct units, one from Massachusetts, one from Louisiana (both units referable to *S. gracilis* (Big.) Beck).
(Massachusetts)
(Louisiana, *Drummond 332*)
SPIRANTHES BECKII
NEOTTIA GRACILIS *Bigelow* (1824)
SPIRANTHES FLORIDANA (*Wherry*) *Cory* (1936)
S. TUBEROSA Raf. sensu Fernald (1946)
Fernald reduced *S. Beckii* and *S. Grayi* to *S. tuberosa* Raf. He assumed that *S. Beckii* and *S. Grayi* are synonymous. Then he made *S. Grayi* a variety of *S. tuberosa*, and adopted as the type of *S. tuberosa*, in part, *S. gracilis* (var. *floridana*). *S. tuberosa* Raf. sensu Fernald is thus concocted from several different species.
SPIRANTHES GRACILIS var. FLORIDANA (*Wherry*) *Correll* (1940)
SPIRANTHES GRACILIS (*Big.*) *Beck* (1833)
SPIRANTHES SIMPLEX *Gray* (1867)
SPIRANTHES TUBEROSA *Raf.* Type unknown. (1833)
SPIRANTHES GRAYI *Ames* (S. SIMPLEX *Gray* not *Grisebach*) (1904)

EXPLANATION OF THE ILLUSTRATION

PLATE II. SPIRANTHES GRAYI *Ames.* 1, lip from a Massachusetts specimen, 3 mm. long, 2.5 mm. wide. 2, lip, from a Georgia specimen, 3.5 mm. long, 2.5 mm. wide.

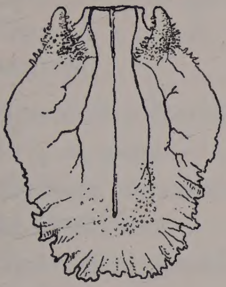
SPIRANTHES GRACILIS var. FLORIDANA (*Wherry*) *Correll.* 3, lip from *Drummond 332* (from a camera-lucida sketch by Victor S. Summerhayes), 3.4 mm. long, 1.3 mm. wide. 5, lip from a Floridian specimen (Volusia County), 4.5 mm. long, 1.5 mm. wide.

SPIRANTHES GRACILIS (*Bigelow*) *Beck.* 4, lip from a Canadian specimen, 5 mm. long, 2.5 mm. wide. 6, lip from a Massachusetts specimen, 5 mm. long, 2.5 mm. wide.

Figs. 1, 2, 4, 5 & 6 drawn by BLANCHE AMES, *with the aid of the camera-lucida.*

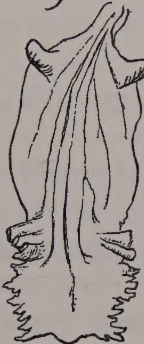
PLATE II

Spiranthes Grayi
Massachusetts



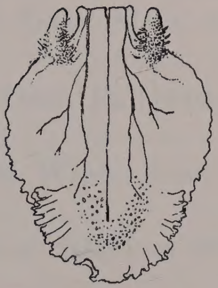
1

Spiranthes gracilis
Var. floridana



3

Spiranthes Grayi
Georgia

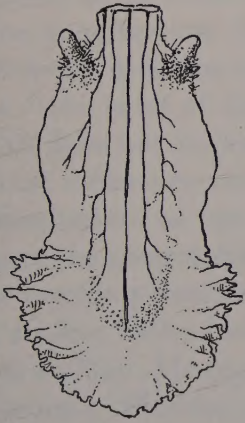


2

New Orleans,
Drummond 332.

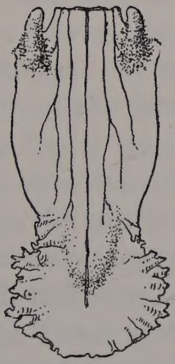
Camera lucida
V.S.S.
Sept. 1947.

4



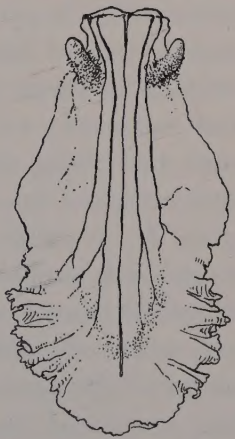
Canada

5



Var. floridana

6



Massachusetts

Spiranthes gracilis (Big.) Beck

II. SPIRANTHES GRACILIS var. FLORIDANA

Spiranthes gracilis (*Bigel.*) *Beck* var. **floridana** (*Wherry*) *Correll* in Bot. Mus. Leafl. Harv. Univ. 8 (1940) 76.

Spiranthes Beckii Lindley Gen. & Sp. Orch. Pl. (1840) 472, *ex parte.*

Ibidium floridanum Wherry in Journ. Wash. Acad. 21 (1931) 49.

Spiranthes floridana (Wherry) Cory in Rhodora 38 (1936) 405.

Spiranthes floridana (Wherry) Correll in Journ. Elisha Mitchell Sci. Soc. 53 (1937) 159.

Spiranthes tuberosa Rafinesque, *sensu* Fernald in Rhodora 48 (1946) 10, 189.

When Edgar T. Wherry described *Ibidium floridanum*, he cited *Spiranthes gracilis* (Bigel.) Beck as a close ally, admitting that a search for morphological differences between these species had not been wholly succesful. The only differences of consequence between *Ibidium floridanum* and its northern ally are, as Wherry stated, chiefly in the color of the flowers, the dates of anthesis and the geographical distribution. It should be noted that Wherry used the length of the lateral sepals in relation to "the bend of the lip" as a separative character, but this does not appear to be a dependable guide to a constant difference between the northern and southern representatives of the *Spiranthes gracilis* alliance. Wherry gave the geographical distribution of *Ibidium floridanum* as reaching westward to Texas and northward to South Carolina, with a blooming season extending from December to May. He reported specimens from South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas. For *Spiranthes gracilis* (Bigel.) Beck he gave

Aiken County, South Carolina, Alabama and Arkansas as the southernmost boundary, with a blooming season extending from July to September.

When growing wild, *Spiranthes gracilis* var. *floridana* may be recognized by the yellowish hue of the rachis and floral bracts and in having the central part of the lip yellow rather than green as in *S. gracilis*. The lip is variable in outline and length, ranging from 3–5 mm. long and varying from pandurate to narrowly oblong, the apical portion being conspicuously denticulate and variously fluted on the margin.

The variety exhibits greater variation than the species, ranging from 1–4 dm. or more in height, with the flowers 3–5 mm. long. The flowers in their arrangement vary from quaquaversal to secund. As is true of the typical species in the extreme North, flowers and leaves are usually present simultaneously. In their venation and texture the leaves of specimens from Florida, Canada and New England are very much alike and arouse the suspicion that the differences in foliar texture between variants of *S. gracilis* emphasized by Professor Fernald in "Rhodora" (48 (1946) 8, t. 993, fig. 6; 994, fig. 5) are the exception rather than the rule and are surely not of taxonomic significance.

Wherry gave the date of the earliest record for the discovery of the variety as 1834, depending on specimens collected by Burrows at Tampa Bay, Florida. In establishing this record he overlooked Drummond's specimens (no. 332) (a component of *Spiranthes Beckii* Lindl.) from New Orleans, collected in 1832.

Until 1905, *S. gracilis* var. *floridana* remained one of the rarest of our Spiranthes. In that year, collecting for me in Dade and Lee Counties, Florida, A. A. Eaton found an abundance of specimens, blooming in February and March. After prolonged study, during which two "herbarium names" came into being, one honoring Eaton, I concluded that the Floridian Spiranthes was puzzlingly close to *S. gracilis* and at most simply a geographical variety.

It may well be that morphological differences sustaining Wherry's conclusions may be discovered, but as yet I have not found them. However, it is indeed clear, that the Floridian variant is much more puzzling taxonomically than the Canadian one which Fernald has separated out because the flowers are usually secund and the leaves are present during anthesis.

EXPLANATION OF THE ILLUSTRATION

Plate III. Spiranthes gracilis var. **floridana** (*Wherry*) *Correll.* 1, plant, natural size, from Volusia County, Florida, February 4, 1947. 2, spike, natural size, from Volusia County, Florida, March, 1944. 3, part of spike enlarged to illustrate rachidial torsion and its effect on the arrangement of secund flowers. 4, flower, side view (lateral sepals removed), about eight times natural size. 5, a lateral sepal, about six times natural size. 6, dorsal sepal, about six times natural size. 7, a petal about six times natural size. 8, lip, partly spread out, about six times natural size. 9, lip, flattened to show contour, about six times natural size.

Drawn from fresh specimens with the aid of the camera-lucida, by Blanche Ames.

PLATE III